E-0 Inspection, Maintenance & Testing of Ambulances February 2024

Suggested Reference Materials:

NFPA 1910: Standard for the Inspection, Maintenance, Refurbishment, Testing and Retirement of In-Service Emergency Vehicles and Marine Firefighting Vessels **(NFPA 1911 CHAPTERS)** 2024 edition (800) 344-3555 or www.nfpa.org

Meritor Preventive Maintenance and Lubrication

MM1. Sections 2, 4 and 6 Download the Meritor documents for no charge at:http://graphicvillage.org/meritor/MM1.pdf

Changes in Diesel Fuel - The Service Technician's Guide To Compression Ignition Fuel Quality - can be downloaded for no charge https://biodiesel4dieseltechs.files.wordpress.com/2015/07/changes-in-diesel-fuel-service-technician-guide.pdf

Selective Catalytic Reduction https://www.dieselforum.org/about-clean-diesel/what-is-scr

API Engine Oil Guide

https://www.api.org/~/media/Files/Certification/Engine-Oil-Diesel/Publications/2019%20EOLCS%20Motor%20Oil%20Guide.pdf

AMD Standard Test Methods https://nasemso.org/wp-content/uploads/AMD-Standardized-Test-Methods.pdf

Cummins Driver Tips for Fire and Emergency Vehicles https://www.cummins.com/sites/default/files/2018-07/4971424.pdf

Any chassis manufacturer's service manual or college level automotive textbook.

LEARNING OBJECTIVES

1. Definitions
   a. Class 1 leak
   b. Class 2 leak
   c. Class 3 leak
   d. diagnostic check
   e. AHJ-Authority Having Jurisdiction
   f. NFPA-National Fire Protection Association
   g. Shall/Should
   h. API-American Petroleum Institute
   i. Preventive Maintenance
   j. DPF-Diesel Particulate Filter
   k. Cetane rating
   l. Hypoid
   m. Out of service (OOS)
   n. Cloud point
   o. Flash point
   p. Inspection
   q. PSIA-Pounds Per Square Inch Absolute
   PSIG-Pounds Per Square Inch Gauge
   r. Interlock
   s. CCA-Cold Cranking Amp
   t. DEF-Diesel Exhaust Fluid - Urea
   u. SCR-Selective Catalytic Reduction
   v. Battery SOH
   w. Chemical Components of Diesel Exhaust (harmful emmissions)
   x. Lubricity
   y. Fuel Biocide
   z. Deficiency
   aa. OBD II
   bb. DTC
   cc. DLC
   dd. DOC (Diesel Oxidation Catalist)
   ee. MIL illumination
   ff. Synthetic & petrolium based oil
   gg. Major repairs
   hh. Conductance & Conductivity test

2. General Requirements
   a. Inspection intervals
   b. Documentation
   c. Operational Tests
   d. NFPA 1071 Technician Qualification Standard
   e. *Changes in Diesel Fuel* - see reference materials list
      (1) sulfur limits
      (2) ASTM-American Society for Testing & Materials
      (3) EPA-Environmental Protection Agency
      (4) Exhaust Systems
      (5) Exhaust system after treatments such as SCR-Selective Catalytic Reduction DPF-Diesel Particulate Filter
      (6) Fuel filter contamination
      (7) Premium diesel
      (8) Care & handling of DEF
      (9) Exhaust system warning lights
      (10) Cetane Requirement
   f. Retirement of Emergency Vehicles
   g. Safety

3. Out of Service Criteria
   a. Tires and wheels
      (1) Minimum tread depth
      (2) Tire Defects
      (3) Wheel defects
   b. Air Brakes
      (1) Leak Down Test
      (2) Low air indicator
   c. Identification of out-of-service components or systems
   d. Class 1, 2 & 3 leaks
   e. Windshield cracks
   f. Seat belts
   g. Engines
      (1) Exhaust leaks
      (2) Engine oil leak
      (3) Coolant contamination
      (4) Fuel leak
      (5) Coolant leak
      (6) Fuel filter contamination
   h. Warning Lights
      (1) Anti lock brake system(ABS) lamp
      (2) Brake warning lamp
   i. Heating Ventilation Air Conditioning(HVAC)
   j. Chassis, Steering & Suspension
   k. Patient Compartment

4. Inspection, Diagnostic Checks and Maintenance
   a. Chassis and Body
      (1) Latch/Hinge lubrication
      (2) Axles, Tires, & Wheels
         (a) Tire age
         (b) Tire wear patterns
         (c) Dept of Transportation(DOT) Code (tire)
         (d) Fastener torque
         (e) Pressure check
         (f) Drive Axle
         (g) Wheel Bearings
         (h) Tire balance
         (i) Tread depth
      (3) Welding procedure
      (4) Drive train
         (a) Drive line
            (i) Lubrication
            (ii) vibration causes
            (iii) end play
         (b) Drive Shaft
      (5) Frame fasteners
      (6) Diagnostic checks
      (7) Vibration Diagnosis
      (8) Suspension components
         (a) Shock absorber type
      (9)Steering System
         (a) Kingpin lubrication
      (10) Patient compartment
         (a) Cot retention

b. Brakes
(1) Uneven brake wear
(2) Oil contaminated air system
(3) Brake fluid level
(4) Power assist
(5) Types of brake fluid
(6) Auto slack adjusters
(7) Air pressure warning
(8) Air system pressure recovery time
(9) Antilock braking system
(a) Leak-down rate
(10) Air operated accessories

c. Engine
(1) Noises
(2) Oil
(a) leaks
(b) change intervals & procedures
(c) requirements
(d) types
(e) motor oil function
(3) Cooling system maintenance
(4) Diagnostic trouble codes
(5) Coolant pH
(6) SCA (supplemental coolant additive)
(7) Coolant type
(a) Organic Acid Technology (OAT)
(b) Hybrid Organic Acid Technology (HOAT)
(c) G-05-Trade names of HOAT coolants
(d) Inorganic Acid Technology(IAT)
(8) Diesel fuel
(9) Air filter restriction gauge
(10) High idle control
(11) Fan Clutch
(12) Exhaust inspection and specification
(13) Engine derate

d. Electrical Systems
(1) Low Voltage
(a) Warning Devices
(2) Battery voltage & checks
(3) Charging system checks
(4)Charge protect high idle operation
(a) Electrolyte
(b) Conditioner charger
(5) Radio Frequency (RF) grounding
(6) Bulb replacement
(7) Siren
(8) Primary/Secondary pump operation
(9) Inverter
(10)Interior lighting
(11)Auto eject

e. Maintenance
(1) Severe Service
(2) Intervals
(3) Procedures

f. Transmission
(1) Mounting
(2) Controls
(3) Types of fluid
(4) Temperature
(5) Procedure
(6) Fuel System
(7) fuel filter replacement
(8) Fuel additives
(9) Brake system

g. Motor vehicle inspection laws
h. Steering
(1) free play
i. Supplemental restraint systems

5. Road Test
a. Speed
(1) Minimum top speed
b. Duration
c. Frequency
d. Weight test
e. Braking System
(1) Pedal pulse
(2) Hand pedal
(3) Hydraulic brake release
(4) Warning Lamps
f. Road conditions
g. Air brakes
(1) Brake pull
(2) Brake release
h. Drive train noise and vibration
i. Steering center
j. Steering Effort
k. Stopping Distance
l. Trans Shifting
m. Drifting/pulling
n. Spinning tires
(1) differential damage

6. Performance Testing
a. Low Voltage system
(1) Battery testing
(a) Conductance
(b) Load test
(c) Cold Cranking Amps (CCA)
(2) Alternator test
(a) Regulator
(3) Testing frequency
(4) Starter wiring test
(5) Solenoid & relays
b. Line voltage electrical systems
(1) Polarity
(2) Inverter
(a) Load test
(3) Shoreline
(a) Auto Eject
(4) GFCI